DIVISION OF RESEARCH, INNOVATION & SYSTEM INFORMATION
Research Initial Scope of Work
SUBMITTAL FORM - FY 14/15

I. Project Number: P85
Project Title: Bus Rapid Transit (BRT) Toolbox

II. Task Number: 2664
Task Title: Assessing Person Throughput to Measure Transportation Impacts for BRT Projects

III. Project Problem Statement:
Senate Bill (SB) 743 is changing the way transportation impacts are analyzed under CEQA by restricting the use of Level-of-Service (LOS) and requiring different metrics to measure impacts particularly in areas that are served by transit. The alternative criteria must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." One suggested criteria is person throughput as a measurement, which could be compared to vehicle throughput. The purpose of this research is to develop a methodology to assess person throughput along a corridor and to develop methodology to calculate transit capacity.

IV. Objective:
There are two objectives of the research: (1) develop methodology to assess person throughput along a corridor and (2) develop methodology to calculate transit capacity.

Person throughput is a potential alternative to using LOS because it can include all modes in the analysis – bicycles, pedestrians, transit, carpool, vanpool, and single-occupancy vehicles (SOV). The challenge is developing methodology for assessing person throughput along a corridor and methods of calculating the capacity of modes. One needed element of person throughput analysis is the development of an effective method of measuring transit capacity.

Transit capacity has traditionally been calculated by multiplying the number of buses per hour and the number of people on the bus (60 people per bus with a 10 minute frequency leads to 360 persons per hour). The problem with this method is that it does not include trip reliability due to congestion or transit friendly features such as transit only lanes or queue jumpers. It has been recognized that transit travel time reliability has significant impact on transit demand, which is dictated by both roadway capacity (congestion, travel time, trip reliability, etc.) and actual transit capacity (seats on the bus per hour).

These are some of the questions that should be answered in the research:

A. What is the propensity of people to use the transit when it is available near an infill project? This has been based on mode split based in the past, like 5% of all trips assumed to be transit trips, but is probably not the best method. Ridership demand should be based on location specific information including the type of transit (light rail, BRT, or bus).
B. If we can estimate the transit mode split better and give "credit" to a project in reducing SOV trips, how much roadway capacity is gained back (if transit uses roadway capacity that will need to be quantified)? As a result, a project may not need to mitigate via roadway improvements, but we need supporting data and appropriate justification.
C. If there are roadway improvements that would make transit more successful, like a dedicated lane, queue jumpers, or signal priority, what are these improvements "worth" in terms of person throughput and therefore reduction of SOV demand. Do these transit specific improvements make transit more successful versus doing general roadway widening? Data and a quantification method are needed to quantify the benefits of transit-only improvements.

The main goal is to determine if person throughput is the best measurement to assess corridor performance and meet the requirements and intent of SB 743.

V. Task Description of Work and Expected Deliverables:

- Review Senate Bill 743 to be familiar with the requirements, along with any recommendations, standards, or guidance of California's Office of Planning and Research concerning SB 743.
- Review existing transportation analysis methodology within Caltrans to determine how projects are analyzed, including how transit is included in the analysis.
- Review the research and methodology to determine pedestrian, bicycle, transit, and automobiles.
- Review existing research and policies of other agencies on transportation analysis that utilizes person throughput, with special focus on how transit is assessed.
- Develop methodology to assess person throughput along a corridor and methodology to measure transit capacity that addresses this proposals objectives.

VI. Background:
Director's Policy 27 - Bus Rapid Transit Implementation Support and Deputy Directive 98 - Integrating Bus Rapid Transit into State Facilities have been approved in recent years requiring the integration of BRT into Departmental processes. BRT services have the potential to increase person-throughput, reduce the rate of congestion for all highway users, mitigate pollution, and reduce

greenhouse gas emissions. Achieving all of these goals would lead to a more effective transportation system that will be able to better meet the needs of future travelers.

Integrating BRT into Caltrans transportation analysis to determine the impacts BRT systems have on corridors has been challenging. The reliance on LOS as a performance measure has made it difficult to quantify the positive impact of transit on the corridor. Research was conducted to assess the impact that BRT projects have on person throughput, since the true goal is to move people through corridors and not vehicles. During the person throughput analysis, the project team recommended expanding the research to look at potential MOEs to not only measure the impact of transit on a corridor but to also meet the requirements of SB 743, which was passed during the initial person throughput project.

Senate Bill (SB 743) was signed by the Governor in September 2013 and affects the way transportation impacts are analyzed under the California Environmental Quality Act (CEQA). The Senate Bill requires transportation agencies (such as Caltrans) to no longer exclusively use Level of Service (LOS) when planning a transportation system. By July 1, 2014 the Governor's Office of Planning and Research (OPR) is required to develop an initial draft of the alternative metrics, which may include "vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated". In order to assist transit agencies deploying BRT throughout California, Caltrans needs to create additional BRT specific metrics than can be used during reviews.

The Division of Mass Transportation (DMT) has requested that the existing research contract, BRT Person Throughput-Vehicle Congestion Tradeoffs (which was amended to focus less on LOS and more on Measure of Effectiveness [MOE] for transit project proposals), be continued on in a new task under the BRT Toolbox Project. This new task will focus on Caltrans new role under SB 743's new changes to CEQA. In preparation of OPR's report, DMT wanted to be prepared with some MOEs of their own that focus more along the lines of Caltrans mission, goals and vision.

VII. Estimate of Duration: The contract is expected to be for 24 months.

VIII. Deployment Potential:
Transportation analysis methodology and MOEs that can assess the impacts of transit on corridor performance and meet SB 743 would be deployable for Caltrans districts to use.

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